

REMARKS

This is a full and timely response to the Office Action mailed October 26, 2009, submitted concurrently with a three month extension of time to extend the due date for response to April 26, 2010.

By this Amendment, claims 6, 21, and 28 have been amended to more particularly define the present invention. Thus, claims 1-53 and 55-58 are currently pending in this application. Support for the claim amendments can be readily found variously throughout the specification and the original claims, see, for example, Figure 1 of the present Patent Application Publication No. 2005/0245051 A1.

In view of these amendments, Applicant believes that all pending claims are in condition for allowance. Reexamination and reconsideration in light of the above amendments and the following remarks is respectfully requested.

Rejections under 35 U.S.C. §112

Claims 6 and 21 are rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the enablement requirement. Further, claims 57 and 58 are also rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement. Applicant respectfully traverses these rejections.

With regard to claims 6 and 21, Applicant believes that the Examiner continues to misunderstand the meaning of the term "*protective material*" recited in claims 6 and 21 in relation with the "*protective material*" recited in claim 1. In the present invention, the protective material is provided on at least one substrate surface of the brittle material substrate (see line 9 of claim 1). Thus, if the protective material is provided on both sides of the brittle material substrate, it is not mutually exclusive to cut the protective material after scribing since the protective material on one side of the brittle material substrate can be cut after the protective material on the other side of the brittle material substrate is first scribed (see Figure 1 of the present drawings). Also, as stated in the previous response (see pages 12 and 13 of the response filed June 18, 2009), the protective material on the scribed surface is not completely cut after scribing since the present invention utilizes a cutter wheel with grooves formed on the blade-edge ridge which results in a pressing pattern of a broken

line (" - - - -" as seen from the vertical perspective) formed on the protective material (e.g. resin film). Thus, it is also possible to completely cut the protective material after the same protective material is first scribed.

Based on the Examiner's arguments in support of his interpretation of the claims with references to Figures 1b and 1c of the present drawings (see pages 7 and 8 of the Office Action), Applicant believes that the Examiner's explanations continue to conflict with Applicant's interpretation of the claims.

Thus, to expedite the prosecution of the present application, Applicant has amended claims 6 and 21 to more particularly define the protective material and the protective material cutting step.

6. (Currently Amended) The method for severing a brittle material substrate according to claim 3, wherein the protective material is provided on both sides of the brittle material substrate, and wherein the method further-comprising comprises a protective material cutting step of cutting the protective material on a non-scribed side of the brittle material substrate, after the scribing step.

21. (Currently Amended) The method for severing a brittle material substrate according to claim 20, wherein the protective material is provided on both sides of the brittle material substrate, and wherein the method further-comprising comprises a protective material cutting step of cutting the protective material on a non-scribed side of the brittle material substrate, after breaking the brittle material substrate provided with the functional layer in the breaking step.

Applicant believes that the above noted claim amendments clearly establish that the protective material formed on the wheel and brittle material, and cutting of the protective material after scribing are not mutually exclusive since it is possible in the present invention to perform a scribing step with the cutter wheel on the protective material and afterwards, cut the protective material after scribing.

With regard to claims 57 and 58, the Examiner states that "There is no support in the original disclosure for cutter wheel being rolled manually" (see page 2 of the Office Action). However, based on Applicant's review of the present specification, Applicant believes that the Examiner's statements and conclusions are incorrect.

Specifically, the present specification discloses that a servomotor 133 is held inverted between a pair of side walls 132. Below the side walls 132, a holder carrying means 134 having an

L-shape when viewed from the side is attached rotatably via a support shaft 135. A tip holder 137 rotatably supports a cutter wheel 136 via a support shaft 139. Bevel gears 138 are mounted to the rotation shaft and the support shaft 135 of the servomotor 133, mating with each other.

Accordingly, by reversely rotating the servomotor 133, the holder carrying means 134 pivots vertically about the support shaft 135, moving the cutter wheel 136 vertically (see paragraph [0072] and Figures 27-28 of the present Patent Application Publication). From this disclosure, Applicant submits that while the servomotor 133 is rotatably driven, the cutter wheel 136 is only rotatably supported. In other words, the support shaft 139 does not rotate. Rather, the cutter wheel 136 rotates about the non-rotating support shaft 139 and thus is *manually* driven, not rotationally driven. This is further supported by paragraph [0074] of the present Patent Application Publication, which states “*The first cutter wheel 21 or the second cutter wheel 40 is rotatably supported by the tip holder 137 held by these scribe heads, and pressed and rolled on a protective material provided on the brittle material substrate, thereby forming a scribe line on the brittle material substrate.*”

Accordingly, in view of such teachings in the specification and the amendments to claims 6 and 21, Applicant submits that these rejections can no longer be sustained and should be withdrawn.

Rejections under 35 U.S.C. §103

Claims 1-4, 19, 20, 22, 23, 25-34, 36, 46-50, 52, 53, 55, and 56 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Jin et al. (U.S. Patent No. 6,121,118) in view of Siniaguine et al. (U.S. Patent Application Publication No. 2001/0001215), Yamamichi (JP 356067933), and Hasegawa et al. (U.S. Patent No. 6,461,940). Further, claims 12-15 and 39-41 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Jin et al. (U.S. Patent No. 6,121,118), Siniaguine et al. (U.S. Patent Application Publication No. 2001/0001215), Yamamichi (JP 356067933), and Hasegawa et al. (U.S. Patent No. 6,461,940), and further in view of Ball (U.S. Patent Application Publication No. 2002/0031864). Applicant respectfully traverses these rejections.

To establish an obviousness rejection under 35 U.S.C. §103(a), four factual inquiries must be examined. The four factual inquiries include (a) determining the scope and contents of the

prior art; (b) ascertaining the differences between the prior art and the claims in issue; (c) resolving the level of ordinary skill in the pertinent art; and (d) evaluating evidence of secondary consideration. *Graham v. John Deere*, 383 U.S. 1, 17-18 (1966). In view of these four factors, the analysis supporting a rejection under 35 U.S.C. 103(a) should be made explicit, and should "identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the [prior art] elements" in the manner claimed. *KSR Int'l. Co. v. Teleflex, Inc.*, 127 S. Ct. 1727, 82 USPQ2d 1385, 1396 (2007). Further, the Federal Circuit has stated that "rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). Finally, even if the prior art may be combined, there must be a reasonable expectation of success, and the reference or references, when combined, must disclose or suggest all of the claim limitations. *See in re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Here, in this case, Jin et al., in combination with Siniaguine et al., Yamamichi, Hasegawa et al., and Ball, fails to teach or suggest all the claim limitations with particular emphasis on the limitations "*wherein the method comprises a first scribing step of pressing and rolling the cutter wheel on a protective material by moving the tip holder in a horizontal direction, in a state in which the protective material is provided on at least one substrate surface of the brittle material substrate, thereby inscribing a scribe line on the brittle material substrate, while simultaneously forming a vertical crack extending from the scribe line in a thickness direction of the brittle material substrate*" (claim 1), "*wherein rolling the cutter wheel on the protective material comprises moving the cutter wheel along a surface of the protective material by rotation without sliding*" (claim 1), "*wherein the apparatus comprises a first scribing device that presses and rolls the cutter wheel on a protective material by moving the tip holder in a horizontal direction, in a state in which the protective material is provided on at least one substrate surface of the brittle material substrate, thereby inscribing a scribe line on the brittle material substrate, while simultaneously forming a vertical crack extending from the scribe line in a thickness direction of the brittle material substrate*" (claim 28), "*wherein the cutter wheel is configured to move along a surface of the protective material by rotation without sliding*" (claim 28), "*wherein rolling the cutter wheel on the*

protective material comprises rolling manually the cutter wheel along the surface of the protective material" (claim 57), and "wherein the first scribing device presses and rolls manually the cutter wheel on the protective material" (claim 58).

The Examiner asserts that the claims are not limited to a cutter wheel that is rolled manually along the wafer and continues to argue that a rotatably driven wheel spins/turns over and over and therefore meets the plain and ordinary meaning of rolling. In addition, the Examiner states that *"While applicant is correct that one definition of rolling is to move on a surface, the claim is not so limited"* (see page 8 of the Office Action). However, Applicant strongly disagrees with the Examiner since claims 1 and 28 currently recite *"wherein rolling the cutter wheel on the protective material comprises moving the cutter wheel along a surface of the protective material by rotation without sliding"* and *"wherein the cutter wheel is configured to move along a surface of the protective material by rotation without sliding"* respectively. Therefore, contrary to the Examiner's assertion, the claims are so limited, and the Examiner has failed to address the noted limitations in his remarks in the Office Action.

As noted in Applicant's responses of November 17, 2008 and June 18, 2009, the cited references of Jin et al., Siniaguine et al., Yamamichi, Ball, and in particular, Hasegawa et al., in the Office Action disclose a saw blade or a dicing blade being rotary driven (mechanism to rotate the saw blade or dicing blade at high speed) for cutting or grinding a substrate, thereby forming the scribe line (groove) having a width (see, for example, column 3, lines 38-39 of Hasegawa et al.). Due to the rotating mechanism of the rotary drive, the "rotating" saw blade or the dicing blade of the cited references is capable of simultaneously cutting or grinding both the protective coating and the substrate for forming the scribe line when the protective coating is formed on a substrate surface. For example, Yamamichi discloses cutting by blade 4, a semiconductor wafer on which a photoresist coating and an aluminum coating are formed on the surface for forming the scribe groove.

As already understood by the Examiner, the cutter wheel of the present invention is not rotary driven, but instead, is rotatably supported, which means that the cutter wheel is rolled manually on the substrate surface by friction force while the cutter wheel is pressed and moved on the substrate. As the cutter wheel is rolled and pressed on the substrate surface, and as a trace that it

is pressed on the substrate surface, the scribe line (marking line) is formed while simultaneously forming a vertical crack extending from the scribe line in a thickness direction of the substrate.

It is important to emphasize the cutting and grinding by a rotary driven saw blade or a dicing blade is clearly distinguishable from the rolling and pressing by the cutter wheel of the present invention. In the Merriam-Webster Online Dictionary, the term "rolling" is defined as "to move along a surface by rotation without sliding" which is clearly not equivalent in meaning to the terms "cutting" and "grinding" of the cited references.

Further, with regard to Applicant's arguments that the prior art has a different purpose than that of the present invention, the Examiner asserts that because the prior art's blade has the same shape as claimed it is capable of being used for the same function (see page 9 of the Office Action). However, claim 1 and the claims depending therefrom are directed to a *method*, not an apparatus. Therefore, even if the prior art cutter wheels were *capable* of being used for the same function as the present invention, there must be some motivation for doing so. The Examiner has failed to provide any such motivation. Further, because the prior art cutter wheels are *rotary driven*, not *rotatably supported* as in the present invention, they are not capable of being used for the same function as the cutter wheel of the claimed apparatus.

In addition, in order to achieve the advantages associated with the cutter blade of the present invention, the prior art blades would have to be completely reconfigured such that they were not rotary driven, but rather rotatably supported. As such, the advantages associated with the cutter blade of the present invention are not unappreciated properties of a prior art device as the Examiner asserts. Further, to modify the prior art blades in such a manner would destroy the principles of operation of the prior art blades since such blades is used for cutting and grinding, and not pressing and rolling. As the Examiner knows, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. In *re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

Still further, in footnote 3 on pages 7-8 of the Office Action, the Examiner states "*In addition use of a manual roller would have been obvious. See e.g. In re Venner, 262 F.2d 91, 95, 120 USPQ 193, 194 (CCPA 1958) (held that broadly providing an automatic or mechanical means*

to replace a manual activity which accomplished the same result is not sufficient to distinguish over the prior art.)” However, the prior art cutter wheels *spin*, thereby cutting and grinding, rather than *roll* along a surface like the cutter wheel of the present invention. Thus, the prior art cutter wheels are not merely automated versions of the cutter wheels of the present invention because they do not accomplish the *same result*. In other words, even if the prior art cutter wheels could be operated manually they would still spin (i.e. would still act to cut and grind), and would not be pressed and rolled along a surface to form a vertical crack as in the present invention.

Thus, for these reasons, withdrawal of the present rejections is respectfully requested.

CONCLUSION

For the foregoing reasons, all the claims now pending in the present application are believed to be clearly patentable over the outstanding rejections. Accordingly, favorable reconsideration of the claims in light of the above remarks is courteously solicited. If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

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Respectfully submitted,

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